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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/733,099

12/10/2003

Je-Young Chang

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EXAMINER

WILSON, GREGORY A

ART UNIT

PAPER NUMBER

3749

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

03/07/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

ED

Office Action Summary

Application No.

10/733,099

Applicant(s)

CHANG ET AL.

Examiner

Gregory A. Wilson

Art Unit

3749

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15-21 is/are allowed.
- 6) ☒ Claim(s) 1-14 and 22-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1, 4, 5, 9 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by **Thomas (6,167,948)**. **Thomas** discloses a device (220) that includes a boiling structure (53) to convert a coolant from liquid to vapor and has a first thermal resistance, a wick structure (21) preferably elements (57, 63, 50) which surround the boiling structure and brings a coolant to the boiler structure for vaporization wherein a person having ordinary skill in the art would recognize that that wick structure has a thermal resistance higher than the resistance of the boiling structure, since the boiling

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structure would have a thermal conductive structure to absorb heat in order to vaporize the fluid. (SEE Figure 2). The top surface of the wick structure (SEE Figure 2, particularly the outer rim of element 50) extends above the top surface of the boiling structure. Thomas furthermore includes a casing configuration as shown in Figure 1.

Claims 1, 5, 8 and 22 are rejected under 35 U.S.C. 102(e) as being anticipated by **Zhou et al (6,994,151)**. **Zhou et al** discloses a boiling structure (99) to convert a coolant from liquid to vapor and has a first thermal resistance, a wick structure (118') surrounding the boiling structure and extending above the boiling structure (Figure 2B) to bring the coolant to the boiling structure in which its' thermal resistance is higher than the boiling structure allowing for vaporization.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Pessolano et al (3,880,230)**. **Pessolano et al** discloses a device (18) including a porous structure (ie: boiling structure) (37) to convert a coolant (41) to a vapor, a wick structure (42) surrounding the porous structure to wet the porous structure with the coolant from multiple sides of the porous structure. **Pessolano et al** does not particular

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teach that the porous structure has an average diameter of 50 μm or 500 μm or the applicants disclosed thermal resistivity. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use these parameters when choosing the porous structure, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

Claims 2, 3, 6-8, 10, and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over either **Zhou et al or Thomas**. Both Zhou et al and Thomas disclose the applicants inventive concept as stated above but does not particular teach specific design values for the porous structure and boiling structure. It would have been obvious to one having ordinary skill in the art at the time the invention was made to choose a boiling structure and porous structure of the sizes as disclosed by the applicant and in the case of the wick, choosing the thermal resistivity and materials used in fabrication, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art and additionally selecting a known material on the basis of its suitability for the intended used as a matter of obvious design choice.

Allowable Subject Matter

Claims 15-21 are allowed.

Response to Arguments

Applicant's arguments filed 11/28/06 have been fully considered but they are not persuasive. With regard to the rejections as they apply to Thomas. Applicant argues that Thomas (as amended) requires a device including "a boiling structure formed of a first porous material, and a wick structure formed of a second porous material surrounding the boiling structure..."; with regard to claim 9, the applicant requires a heat pipe including "a boiling structure formed of a porous material; and a wick formed of another porous material surrounding all sides of the boiling structure" and furthermore that Thomas fails to disclose all the elements of the device. The examiner would like to direct the applicants attention to figure 34 of Thomas which is one embodiment of the main invention of Figure 2. Porous is described in Webster's New World Dictionary as full of pores through which fluid, air or light may pass or by Webster's II New Riverside University dictionary as allowing the passage of gas or liquid through pores or interstices. The element 224 which corresponds to the boiling structure of figure 2, has a structure containing pores (226), this is recognized to read on the applicants claimed boiling structure. Additionally the surrounding elements (222) anticipate the applicants claim of a wick structure formed of a second porous material, the structure of (222) is different than the structure of (224).

With regard to applicants arguments as they pertain to the rejections made under Zhou et al, namely that Zhou et al fails to disclose " a porous structure formed of a porous material; and a wick surrounding the porous structure to wet the porous structure with the coolant." Applicant argues that with regard to Figures 2A and 2B of Zhou et al, wicking structure 118' just abuts a top surface of heat source 99 and that by

this does not reasonably “surround” it. The applicant has not disclosed in the specification what is regarded as “reasonably surrounding” a heat source, nor do the claims recite such a limitation. As best understood by the examiner, the wick structure (118’) as shown in figure 2B completely covers the heat source 99 and one of ordinary skill in the art could construe that this would constitute “reasonably surrounding” the heat source since multiple sides of the heat source are covered by the wicking structure 118.

Additionally applicant argues that Zhou et al fails to disclose that the heat source 99 is “wet...with coolant” as required by claim 22 and that the Zhou et al fails to disclose a boiling structure formed of a porous material. The examiner respectfully disagrees and submits that liquid that enters (102’) and travels through porous wick structure (118’) will inherently wet the heat surface (99) with the liquid coolant since Zhou et al does not disclose any barrier between the heat source (99) and the wick structure, in addition, in column 6, lines 18-20, Zhou et al discloses the use of alternative heat sources and in column 6, lines 24-36, Zhou et al discloses heat exchanger (100) being integrally formed onto or within the device (99) by directly fabricating the channels on the surface of the heat source device (99) this recitation supports a teaching of a porous structure since channels can be made through the heat source and as described previously, porous is full of pores (holes, cavities, or tiny openings) through which fluids, air or light may pass.

Applicants arguments as they pertain to Pessolano et al that the prior art reference fails to teach or suggest that collector 37 is “formed of a porous material” as

required by claim 22 as amended is not persuasive. Applicant argument is directed to the drawings in particular Figure 3, in which it is argued that collector is "drawn" as a solid object and not a porous object. This is an inconclusive argument which lacks any merits since very rarely are drawings submitted to include cross-sectional patterns to indicate what type of material is being used. The examiner directs applicants attention to column 5, lines 44-46, which gives evidence of porosity wherein it is disclosed that the collector 37 serves to collect vapor bubbles which provide the means to pump working fluid via the percolation channel to the upper extremities of the wick structure. The traveling of fluid in this way through the collector 37 meets the description of porous as defined by the dictionary definition as previously defined.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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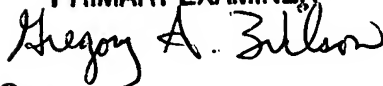
the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregory A. Wilson whose telephone number is (571)272-4882. The examiner can normally be reached on 7 am - 4:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Josiah Cocks can be reached on (571) 272-4874. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

GREGORY WILSON
PRIMARY EXAMINER



Gaw

March 1, 2007